National parks are established "*…to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same… as will leave them unimpaired for future generations.*" ORGANIC ACT 1916 (16 USC 1)

Introduction

By Cherry Payne, Scott Gende, and Tomie Lee

As the ship edges to the face of Margerie Glacier, 3,000 sets of eyes study the blue-white swath of ice. The ship, as long as three football fields and high as a small sky-scraper, is eerily silent as it slows to a stop. The glacier's groans and cracks and the call of the aptly named black legged kittiwakes are easy to hear. Seals, resting on ice floes, gaze at the steel behemoth before them. But below the decks, it is a different story: 1,300 crew operate a mini-factory to serve this city on the sea. Diesel generators pump out electricity, driving utility systems to make potable water, treat sewage, and provide climate control. In the water, azipods, looking like mini-submarines with mammoth propellers, allow the captain to spin the ship on its axis. In the summer months, this event happens daily. On most days, it happens twice daily.

Each year, over 400,000 people, the majority of park visitors, enter Glacier Bay National Park and Preserve on cruise ships. The experience is unparalleled, allowing multi-generational families from all over the world to witness the largest NPS marine park, whose waters nourish abundant wildlife and are found in a vast wilderness bounded by stunning scenery. In an unique program pioneered here, rangers board each ship to provide commentary over its public address system. Children earn Junior Ranger badges. Hundreds of passengers crowd the ship's theater to hear a ranger and often a Huna Tlingit cultural interpreter talk about this wild and remote piece of America. Surveys have found what many passengers communicate to the rangers: the day in Glacier Bay is the highlight of their Alaska cruise.

Figure 1. Cruise ship in Glacier Bay.

NPS photograph by Robert Winfree

Tourist-laden ships began to visit Glacier Bay in 1883 but abruptly stopped in 1899 when earthquakes choked the bay with floating ice. The modern cruise ship era resumed with occasional visits in the 1950s. The number of ships increased substantially by the 1970s concurrent with a drop in endangered humpback whales feeding in the park. Soon, the park management was wrestling with issues related to ship quotas, vessel/marine mammal interactions, garbage disposal, stack emissions, and how cruise ships and other vessel traffic affect park visitors and park resources.

Every national park struggles with the two-fold NPS mandate of preservation and enjoyment. Overwhelmingly, most people who visit Glacier Bay do so via ship. But how many marine vessels are too many? Does their propeller noise interfere with wildlife foraging and communication? Do they displace whales or endangered sea lions found in the park? Do their stack emissions alter air quality? Do they disrupt resting animals or change feeding behaviors?

And how do large vessels, mainly cruise ships, affect the Huna Tlingit's perception of their homeland? What is the reaction by kayakers, other boaters, even people on the ships themselves when they see a cruise ship? For over 30 years, many have weighed in on these questions, resulting in nine pieces of legislation and one lawsuit that drives how vessels are managed in the park.

In 2003, the NPS established a process for vessel management in the *Vessel Quota and Operating Requirements Final Environmental Impact Statement* (VQOR FEIS). The Record of Decision (ROD) for that document directed the park to establish an independent Science Advisory Board, made up of ecologists, social scientists, engineers, biologists, to create a research framework to assess how cruise ships and other vessel traffic might affect the physical, biologic, cultural and sociological environment. The results of those studies would help inform the superintendent in applying the adaptive management approach called for in the VQOR FEIS: an annual determination of the level of marine traffic and the seasonal cruise ship quota based on park management objectives, applicable authorities, public comment and scientific information.

In 2004, following an open invitation to many state and federal agencies for nominations to serve on the Science Advisory Board, the first meeting occurred. A year later, the board submitted its first report to the park which highlighted a number of potential research efforts related to the impacts of cruise ships to park resources. In 2006, at the request of the park, the board submitted a prioritized research and monitoring framework. A number of those efforts were subsequently implemented or supported.

Science Advisory Board Members

Current

Susan J. Alexander, Ph.D., Regional Economist, Alaska Region Secure Rural Schools Coordinator, Alaska Region, USDA Forest Service, Juneau AK.

James L. Bodkin, Research Wildlife Biologist, USGS Alaska Science Center, Anchorage, AK.

Lee Cerveny, Ph.D., Research Social Scientist; Pacific Northwest Research Station; Seattle, WA.

Scott Gende, Ph.D. (Chair), Senior Science Advisor, Southeast Alaska Coastal Cluster Program, National Park Service, Juneau, AK.

John K. Jansen, Wildlife Biologist, National Marine Mammal Laboratory, Alaska Fisheries Science Center, NOAA/NMFS, Seattle, WA.

Blair Kipple, Naval Surface Warfare Center - Detachment Puget Sound, Silverdale, WA.

Past

Gail Blundell, Ph.D., Harbor Seal Research Program, Division of Wildlife Conservation, Alaska Department of Fish and Game, Juneau, AK.

Heather Brandon, Marine Policy Advisor, Alaska Department of Fish and Game, Juneau, AK.

Carolyn Morehouse, Commercial Passenger Vessels Environmental Compliance Program, Alaska Department of Environmental Conservation, Juneau, AK.

Robert Schroeder, Ph.D., Regional Subsistence Coordinator, Alaska Region, USDA Forest Service, Juneau, AK.

Figure 2. Science Advisory Board members and affiliations

Timeline 1980 - 2010

1980
Concession permits established permitting entry by existing cruise ship operators; seasonal quota set at 89 vessels.

1984
Park General Management Plan limits cruise ship entries to no more than 2 per day; seasonal cruise ship entries increased to 102, and then, in 1987, to 107, based on a National Marine Fisheries Service Biological Opinion allowing a 20% increase.

1990
GLBA Cruise Ship Management Plan implemented with the objective of increasing opportunities for competitive allocation of entries (to provide park visitors with various choices); new round of competition for concession contracts were initiated.

1996
Finding of No Significant Impact (FONSI) for Vessel Management Plan Environmental Assessment allows 139 cruise ship entries, and up to 184 pending outcome of research on impacts; pollution minimization plans are required.

1998
A cruise line enters plea agreement and pays fine for unlawful discharge of oil; two years later the same company purchases two oil spill recovery barge/skimmers to be placed in the park.

2000
A cruise line funds measurement of the sound signature for one of its ships and begins submitting opacity/location records for each visit.

Figure 3. Timeline

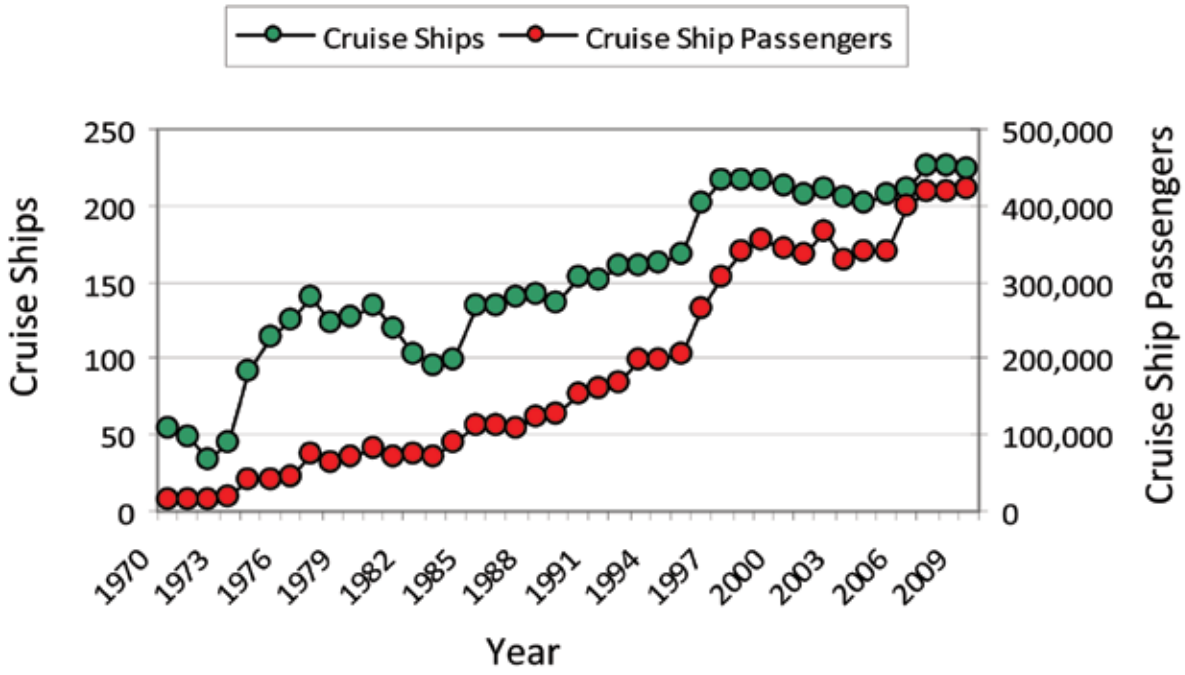

Figure 4. Glacier Bay Cruise Ship Numbers, 1970-2009

In December 2009, researchers, representing various disciplines, presented the results of their studies to one another, NPS managers and staff, and to the Science Advisory Board. The interdisciplinary approach and subsequent discussions will help inform the next round of management decisions for annual cruise ship entries to Glacier Bay, the appropriate level of smaller vessel traffic, and set the stage for the SAB's continuing work to recommend future research related to the question.

The studies, individually and across disciplines, will help the NPS to ensure that there are opportunities for high-quality experiences in the park while protecting the very resources that Americans cherish at Glacier Bay, now and into the future.

2001
Following a lawsuit filed in 1997, the NPS is found in violation of National Environmental Policy Act (NEPA) because the 1996 Vessel Management Plan was not an Environmental Impact Statement (EIS); court orders NPS to reduce seasonal entries to the pre-1996 level of 107.

2002
The 2002 Interior Department Appropriations Act (PL 107-63) directs the NPS to complete a new vessel management plan EIS by January 1, 2004, and sets the cruise ship quota at 139.

2003
Record of Decision (ROD) issued for Vessel Quota and Operating Requirements EIS; sets the 92-day peak season (June-August) quota at 139, with potential to increase to a maximum of 184 (2 ships per day, every day during the peak season). Science Advisory Board formed to advise the superintendent regarding changes in cruise ship quotas.

2004
Male calf of humpback whale 1432 found dead near Strawberry Island in the park; necropsy revealed death was the result of blunt trauma, consistent with a vessel strike. Vessel was never identified.

2006
NPS publishes proposed vessel regulations which set limits for cruise ships during the shoulder season (May, September); superintendent increases quota for the 2007 peak season by 10%, to 153.

2010
New suite of cruise ship concession contracts takes effect; operators agree to continue new strategies to reduce air pollution, water pollution and underwater sound; one company offers to make enhancements to the interpretive/educational program and to develop and share with other companies a "whale strike avoidance program."